Chapter 23
The Business of Collaborating:
Designing and Implementing a Group Decision-making Scenario Using the TeamMATE Collaborative Computer Game

Daniel I. Thomas
Intelligent Control Systems Laboratory, Griffith University, Australia

Ljubo B. Vlacic
Intelligent Control Systems Laboratory, Griffith University, Australia

ABSTRACT

This chapter explores how business partners can come together and engage collaboratively to solve a resource-scheduling problem for a large multinational organization consisting of multiple regions. To solve this problem, a TeamMATE[1]© computer game scenario was constructed. Over the course of the chapter, the structure of the collaborative computer game is discussed and implemented. The constructed play scenario is then demonstrated showing group decision-making in action regardless of whether the business partners are human or virtual beings. Thus, the developed collaborative computer game work environment can be used for real collaborative activities (where all players are just human beings) or a simulation work environment (where some of the players are virtual beings).

INTRODUCTION

Computer games offer a wealth of opportunities for research as computer game "worlds" offer varying degrees of sophistication with which to investigate a particular area of interest. Of particular note are computer games underpinned by mechanisms that enable interactions among players and engagement of players. In these types of games, a number of players come together to solve a particular problem collaboratively. These collaborative decision-making games engage multiple participants in a wide variety of ways from entertainment to education and training.

As computer games become more sophisticated and more distributed, there are also opportunities to investigate how virtual beings may engage with

humans to create richer, more novel computer game experiences. The engagement of human and virtual beings as functionally equal partners (or FEPs) makes collaborative computer games capable of supporting group based decision-making processes in business type scenarios.

In this chapter we demonstrate how Team-MATE© is being used to design and implement a resource scheduling system involving national and regional management, towards resolving a problem taken from the real business world. By the end of this chapter, the reader shall:

1. Develop an understanding of how to apply the Collaborative Process to a specific business scenario
2. Understand how to integrate a computer game enabled group decision-making process into a collaborative scenario
3. Through the demonstration of TeamMATE©, be aware conceptually of some of the data requirements of Functionally Equal Partners (FEPs) in order to interact with the computer game world.

BACKGROUND

Computer games have been found to be an effective means of pursuing academic research questions, with calls for working towards cohesive interaction between industry and academia (Johnson & Wiles, 2001).

It is important to provide a context within which collaborative computer game research has developed. The literature discussed here is not exhaustive, but rather provides the necessary background to specifically focus on how collaborative computer game interest has developed over time and how this identifies a need to engage in further research. For much of this work, the frameworks within which studies have occurred stem from fields of Artificial Intelligence (AI) research primarily; Autonomous Agents and Multi-Agent Systems (MAS).

Definitions of autonomous agents are many and varied. In particular, the definitions attempt to describe agents in terms of the attributes that they exhibit. For example, the definition of an autonomous software agent presented by Bradshaw (Bradshaw, 1997) builds upon the properties of agents by enumerating the attributes of agents as espoused by Etzoni and Weld (Etzoni & Weld, 1995) and Franklin and Graesser (Franklin & Graesser, 1997). This description of the properties allows for many and varied classifications of systems under the "umbrella term" of agent, as Nwana (Nwana, 1996) calls it. Franklin and Graesser describe a "taxonomy" of agents, providing their definition of an agent:

An autonomous agent is a system situated within and part of an environment that senses that environment and acts on it, in pursuit of its own agenda and so as to effect what it senses in the future. (Franklin & Gaesser, 1996)

This definition highlights key attributes of autonomous agents; the concepts of *autonomy*, *reactivity*, *perception*, *goal-directed behavior* and the concept that the agent has some understanding of *time*. The most common frame for autonomous agents is the definition presented by Jennings and Wooldridge (Jennings & Wooldridge, 1995). They describe agents in terms of weak notions of agency (the attributes exhibited by autonomous agents) and strong notions of agency that draw upon the Belief-Desire-Intention (BDI) model of agent behavior (Bratman, 1987).

Computer games in research have seen many developments over the last decade. Earlier work in the field of virtual players (commonly referred to as "Bots") tended towards the adversarial variety such as Laird's Quakebot (Laird, 2001). In the same year, Adobbati et al. presented the Gamebots virtual world test bed based upon the Unreal Tournament 3D game engine (Adobbati, Marshall, Scholer, & Tejada, 2001). Gamebots was developed using principles of Multi-Agent Systems design, specifically developed as a

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